

DO NOT ENTER: /K.M./ (12/30/2008)

AMENDMENT UNDER 37 C.F.R. § 1.116  
EXPEDITED PROCEDURE  
GROUP 1797  
**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

Docket No: Q81022

Masahiko HIROSE , et al.

Appln. No.: 10/826,301

Group Art Unit: 1797

Confirmation No.: 9820

Examiner: Krishnan S. MENON

Filed: April 19, 2004

For: COMPOSITE SEMIPERMEABLE MEMBRANE AND PROCESS FOR PRODUCING THE SAME

**AMENDMENT UNDER 37 C.F.R. § 1.116**

**MAIL STOP AF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Amendment is submitted in response to the Office Action dated July 29, 2008.

Review and reconsideration on the merits in view of the following remarks and amendments is respectfully requested.

A Petition for Extension of Time for two months is attached hereto and incorporated herein by reference, extending the time for response from October 29, 2008 to December 29, 2008.

An Information disclosure Statement is also submitted herewith.

Please amend the above-identified application as follows on the accompanying pages.

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**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

1. (currently amended): A process for producing a composite semipermeable membrane which comprises forming on a surface of a porous supporting film a thin film comprising a polyamide resin obtained by reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, wherein the polyfunctional amine ingredient is aromatic or aliphatic,  
  
wherein the ratio of the normality of the alkali metal hydroxide to that of the organic acid to be mixed therewith (alkali metal hydroxide/organic acid) is from 1.2/1 to 0.9/1, and  
  
wherein the thin film is heated to 100°C or higher, and  
  
wherein the organic acid contains a sulfo group.
2. (original): The process as claimed in claim 1, wherein the thin film is formed by bringing an aqueous solution prepared by mixing at least the polyfunctional amine ingredient, the alkali metal hydroxide, the organic acid, and water into contact with an organic solution containing the polyfunctional acid ingredient to cause interfacial polymerization.
- 3-4. (canceled).
5. (original): The process as claimed in claim 1, wherein the organic acid is an organic acid which does not have a long-chain alkyl group having 6 or more carbon atoms.

6. (canceled).

7. (original): The process as claimed in claim 2, wherein the aqueous solution has a pH of 5-11.

8-16. (canceled).

**REMARKS**

Upon entry of the amendment, claims 1-2, 5 and 7 are all the claims pending in the application. Claim 1 has been amended to incorporate the subject matter of claim 4, which has been canceled.

Applicants respectfully submit that with the entry of the proposed amendments, the present application will be in condition for allowance.

Accordingly, entry of the above amendments is respectfully requested.

**I. Response to Rejection of Claims 1, 2, 4, 5, and 7 under 35 U.S.C. § 103(a)**

Claims 1, 2, 4, 5 and 7 are rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Agarwal (US 6,833,073/US 2003/0066796).

Applicants respectfully traverse the rejection.

Claim 1 is directed to a process for producing a composite semipermeable membrane which comprises forming on a surface of a porous supporting film a thin film comprising a polyamide resin obtained by reacting a polyfunctional amine ingredient with a polyfunctional acid ingredient in the presence of at least an alkali metal hydroxide and an organic acid, wherein the polyfunctional amine ingredient is aromatic or aliphatic, wherein the ratio of the normality of the alkali metal hydroxide to that of the organic acid to be mixed therewith (alkali metal hydroxide/organic acid) is from 1.2/1 to 0.9/1. The organic acid contains a sulfo group.

The Examiner asserts that the arguments regarding the lack of teaching of a heating at a temperature of 100°C or higher in Agarwal are speculative and without any supporting evidence. The Examiner also argues that the argument is not commensurate in scope with the claims. However, claim 1 does recite such feature.

In addition, Agarwal does not disclose the use of specific organic acids, other than propionic acid. The present invention uses an organic acid that contains a sulfo group, which is not disclosed, taught or suggested by Agarwal.

Hence, it is respectfully submitted that Agarwal does not anticipate or render the present invention according to claim 1 obvious.

More specifically, while a sulfo group is a strong acid group, a carboxyl group is a weak acid. For example, sulfuric acid, which is one example of a compound having a sulfo group, has a very small value of  $pK_a = 1.99$  (namely, it is a strong acid). On the other hand, propionic acid, which has a carboxyl group and is disclosed in Agarwal, has a large value of  $pK_a = 4.67$  (namely, it is a weak acid).

In the present invention, since the alkali metal hydroxide has a hydroxyl group which is a strong alkali, it is possible to maintain a pH value of the aqueous solution of 5-11 (as recited in claim 7) in a range of the normality recited in claim 1 by using the compound having a sulfo group together with the alkali metal hydroxide.

As disclosed in pages 3-4 of the specification, when the aqueous solution has an increased pH, this tends to result in a reduced permeation flux, and when the aqueous solution has a reduced pH, reactivity in interfacial polymerization is reduced and high-salt rejecting ability tends to not be obtained. Namely, the composite semipermeable membrane of the present invention has a high-salt rejecting ability and high permeation flux.

For at least the above reasons, it is respectfully submitted that claim 1 is patentable over Agarwal.

In addition, claims 2, 5 and 7 depend from claim 1, and thus it is respectfully submitted

that these claims are patentable for at least the same reasons.

In view of the above, withdrawal of the rejection is respectfully requested.

**II. Response to Rejection of Claims 1, 2, 4, 5 and 7 under 35 U.S.C. § 103(a)**

Claims 1, 2, 4, 5 and 7 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over W0 99/01208 (US equivalent to Hirose (US 6,723,422)).

Applicants respectfully traverse the rejection.

The Examiner asserts that Hirose discloses that the organic acid and the alkali metal hydroxide can be present at the same time in the amine solution. However, the claimed process is not disclosed, taught or suggested by Hirose.

Additionally, Hirose does not teach or suggest the advantage regarding the presence of the organic acid and the alkali metal hydroxide at the same time in the amine solution. Thus, one of ordinary skill in the art would not arrive at the claimed invention based on the disclosure of Hirose.

For at least the above reasons, it is respectfully submitted that claim 1 is patentable over Hirose.

In addition, claims 2, 5 and 7 depend from claim 1, and thus it is respectfully submitted that these claims are patentable for at least the same reasons.

In view of the above, withdrawal of the rejection is respectfully requested.

**III. Response to Rejection of Claims 1, 2, 4, 5 and 7 under 35 U.S.C. § 102/103**

Claims 1, 2, 4, 5 and 7 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as allegedly being obvious over, Tomaschke (US 6,464,873).

Applicants respectfully traverse the rejection.

The Examiner asserts that camphor sulfonic acid is an organic acid and that acidity in an acid is caused by hydronium ions when the acid dissociates in water, which is true whether the acid is organic or mineral. Specifically, the Examiner asserts that TEACSA is hydrolyzed in water to form camphor sulfonic acid.

Applicants respectfully disagree. It is submitted that Tomaschke does not disclose the use of an organic acid or the claimed ratio of normality of the alkali metal hydroxide and organic acid. Since TEACSA and sodium hydroxide is used in the Example of Tomaschke, the pH of the solution is 12.75 (*see* column 9, lines 65-66). Under this environment (*i.e.*, a strong alkali condition), TEACSA is considered to be existed as a salt (TEACSA as is, not separate to camphorsulfonic acid and triethylamine). Therefore, Tomaschke does not disclose the use of an organic acid.

In addition, since Tomaschke does not disclose the use of an organic acid, it does not disclose the claimed ratio of normality of the alkali metal hydroxide and organic acid.

For at least the above reasons, it is respectfully submitted that claim 1 is patentable over Tomaschke.

Furthermore, each of claims 2, 5 and 7 depend, directly or indirectly from claim 1. Thus, it is respectfully submitted that these claims are patentable for at least the same reasons as claim 1.

Accordingly, withdrawal of the rejections is respectfully requested.

#### **IV. Conclusion**


In view of the above, reconsideration and allowance of claims 1, 2, 5 and 7 is

respectfully requested.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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